Impacts Must be Fully Mitigated

ESA s. 7(a)(2) prohibits federal agencies from approving actions which would destroy or "adversely modify" species' critical habitat areas.

The HCP and DEIS must provide adequate mitigation for impacts to key aquatic habitat variables including temperature, invertebrates and other food sources, and the timing and intensity of water flows. The HCP and DEIS must provide adequate and specific mitigation measures for pollution from herbicides and other chemicals, impacts of herbicides and other chemicals on upslope riparian areas and thus downslope aquatic ecosystems, and the impacts of upslope logging and other practices.

The final critical habitat designation for chinook salmon (Puget Sound, Lower-Columbia, Upper Willamette, Upper Columbia Spring run, CA Central Valley Spring run, CA Coastal ESUs) and steelhead trout (S. CA, S-Central CA coast, Central CA coast, CA Central Valley, Upper Columbia, Snake River Basin, Lower Columbia, Upper Willamette, Mid-Columbia ESUs) includes: "all river reaches accessible to listed salmon or steelhead within the range of the ESUs listed, except for reaches on Indian lands. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and river reaches...." The Federal Register notice indicates that non-federal forestry activities are among those which may affect critical habitat. The notice further indicates that essential habitat for the listed species includes: "(1) juvenile rearing areas; (2) juvenile migration corridors; (3) areas for growth and development to adulthood; (4) adult migration corridors; (5) water velocity; (6) cover/shelter; (7) food; (8) riparian vegetation; (9) space; and (10) safe passage conditions." The notice further indicates that summaries of the environmental parameters and freshwater conditions that harm the listed species are included in Brown & Moyle (1991), Nehlsen et al (1991), Higgins et al (1992), Botkin et al (1995), and Spence et al (1996). The notice further indicates that the adjacent riparian area for the salmon and steelhead species is the "area adjacent to a stream that provides the following functions: shade, sediment transport, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter" The notice further indicates that "habitat quality in this range is intrinsically related to the quality of riparian and upland areas and of inaccessible headwater or intermittent streams which provide key habitat elements (e.g., large woody debris, gravel, water quality) crucial for salmon and steelhead in downstream reaches." The notice further indicates that "streams and stream functioning are inextricably linked to adjacent riparian and upland (or upslope) areas..." and that the riparian zone "stores sediment, recycles nutrients and chemicals, mediates stream hydraulics, and controls microclimate...," and that "healthy riparian zones help ensure water quality essential to salmonids as well as the forage species they depend on." The notice further indicates that "human activities in the adjacent riparian zone, or in upslope areas, can harm stream function and can harm salmonids...," and that "timber harvest, road building, grazing, cultivation, and other activities can increase sediment, destabilize banks, reduce organic litter and woody debris, increase water temperatures, simplify stream channels, and increase peak flows leading to scouring." The notice further reaffirmed that available regulatory mechanisms are inadequate and that regulated activities

continue to pose a potential threat to the species' existence. [65 Federal Register 32, February 16, 2000]

Proposed critical habitat for chinook salmon (Central Valley Spring run, Central Valley Fall/late Fall run, S. OR and CA coastal, Puget Sound, Lower Columbia, Upper Willamette, Upper Columbia Spring run, and Snake River Fall ESUs) includes "...the water, substrate, and adjacent riparian zone of all accessible estuarine and riverine reaches...." Adjacent riparian zones are defined as "...areas within a slope distance of 300 ft. (91.4m) from the normal line of high water of a stream channel or adjacent off-channel habitats...." The Federal Register notice further indicates that essential features of chinook critical habitat include "...adequate: (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions...." The notice further indicates that habitat quality is "...intrinsically related to the quality of upland areas and of inaccessible headwater or intermittent streams which provide key habitat elements (e.g., large woody debris, gravel, water quality) crucial for chum salmon in downstream reaches." The notice further indicates that logging, roading, pesticide applications, application of other chemicals, and non-point source pollution are all likely to affect critical habitat for chinook. [63 Federal Register 45, March 9, 1999]

The HCP Handbook states that mitigation should not only be based on sound biological rationale, but also be "commensurate with the impacts." [USFWS et al (1996), p. 3-19.]

Sierra Club et al v. Bruce Babbitt et al recently held that replacement habitat must be provided for habitat destroyed pursuant to ITPs. [Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

Listed plants must also be addressed and protected by ITPs and HCPs under ESA s. 7(a)(2). The Services may not approve an action which jeopardizes the survival or recovery of listed plants.

The HCP must also meet, with regard to each of the covered species, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999.]

"Often, there is a direct relationship between the level of biological uncertainty for a covered species and the degree of risk that an incidental take permit could pose for that species. Therefore, the operating conservation program may need to be relatively cautious initially and adjusted later based on new information."

When evaluating the HCP, the Services also need to employ a more cautious approach than has often been used. The ESA expressly states that the Services may not approve HCPs and ITPs if they would "appreciably reduce the likelihood of the survival *and recovery* of the species in the wild." [ESA s. 10(a)(2)(B)(iv), emphasis added.] However, the Services

appear to have often interpreted this standard as stating, more or less, that HCPs and ITPs may not be approved only if they would "jeopardize species' continued existence." This is a much lower standard than that specified in the ESA, and as used by the Services, allows approval of HCPs which utilize far less effective mitigation measures, and which are less risk averse.

Impacts Must be Minimized and Mitigated to the Maximum Extent Practicable

ESA s. 10(a)(2)(B)(ii) requires impacts be minimized and mitigated to the "maximum extent practicable." The Services must analyze and document whether the HCP has indeed minimized and mitigated "take" to the maximum extent practicable. [*Sierra Club et al v. Bruce Babbitt et al*, Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

Longer timber rotations and other alternate silvicultural methods, for example, can minimize watershed disturbances and habitat impacts, while generating competitive economic returns. (See Hall (1999); this document has been provided to the Services on several recent occasions.) Moreover, the production of mushrooms and clean water, the sequestration and storage of atmospheric carbon dioxide, and the provision of other nontimber forest products and ecosystem services from older, healthier forests can generate significant supplemental revenues.

The Services need to independently evaluate Simpson's timber resources, site productivity, and other silvicultural factors, and determine what silvicultural and non-timber land management practices would in fact minimize and mitigate impacts to the plan species to the maximum extent practicable.

Several existing HCPs explicitly require longer timber rotations or other improved silvicultural methods, demonstrating their practicability. The Elliott State Forest HCP uses 80 to 240 year timber rotations and maintains significant late successional reserves above and beyond the narrow stream buffers.

The literature referenced in Section IV of our comments highlights a number of impact minimization and mitigation measures which are important for the conservation of imperiled fish, wildlife, and plants, and which would be economically "practicable" for forest landowners.

In the context of the Clean Air Act, "practicable" means economically or technologically possible. [*Union Electric Co. v. EPA* (427 US 246 (1976)), as cited in Arum (1998).] Likewise, the cost of an alternative should only determine its practicability in relation to other alternatives with the same level of environmental performance. [*Friends of the Earth v. Hall* (693 F Supp 904, 947 (W.D. Wash 1998), as cited in Arum (1998)] The NMFS rules for permits also state that the Administrator will consider whether the best available technology was used for impact minimization and mitigation. [50 CFR 222.22(c)(iv).]

The Services' HCP Handbook states that if the landowner cites economic considerations as the reason for failing to utilize an alternate land management approach, then the landowner must provide supporting economic information, unless it is proprietary. [USFWS et al (1996), p. 3 - 36.] The Handbook also requires the Services to consider the cost of additional mitigation, the benefits of additional mitigation, the amount of mitigation provided by other landowners, and the landowner's own abilities. [USFWS et al (1996), pp. 3-36 and 7-3.]

ESA ss. 10(a)(2)(A)(iv) and 10(a)(2)(B)(v) also authorize the Services to require mitigation measures *beyond* those "practicable" mitigation measures required by ESA s. 10(a)(2)(B)(ii). Likewise, the HCP Handbook also states that all HCPs should address other measures required by the Services. [USFWS *et al* (1996), pp. 1-7 & 3-10.]

The HCP Must Meet the Species' Recovery Needs, Including by Restoring Habitats and Enhancing Species' Populations if Necessary

As indicated in ESA ss. 2(b), 2(c), and 3(3), the ESA's ultimate goal is, in effect, to recover threatened and endangered species, including to the point where they can be removed from the endangered species list. This has been affirmed by the US Supreme Court in *TVA v. Hill* and *Babbitt v. Sweet Home Chapter of Communities.* [See Gaffney et al (1997).] Several district court cases have also held that recovery must be assessed above and beyond mere survival. [See *House v. USFS* and *Idaho DFG v. NMFS.*]

The HCP and DEIS need to identify, for each of the covered species, population levels, specific habitat conditions, and other factors that would correspond to genuine recovery across each of the species' ranges. Likewise, the HCP and DEIS need to provide concrete quantitative assessments of how the populations and habitat conditions stemming from the ITP and HCP will compare to these recovery indicators and standards.

The ESA's s. 7 requirement to avoid adversely modifying species' critical habitats also requires the Services to ensure that HCPs and ITPs do not harm habitats needed for species' recovery, *including currently unoccupied habitat areas.*

ESA s. 10(a)(2)(B)(iv) explicitly and clearly precludes the Services from approving an HCP which will "appreciably reduce the likelihood of the survival and recovery of the species in the wild." The HCP Handbook also states that the Services should "discourage" HCPs that preclude recovery options or which are inconsistent with recovery plans. Consistency with recovery plans is also included in the Handbook as a "helpful hint." [USFWS et al (1996), p. 3-20 and 1-15.]

The Services need to thoroughly analyze how Simpson's ITP, HCP, and all logging and other land use practices permitted by the ITP, HCP, and IA will affect each covered species' chances of recovery, based on the best current information on the species, the full range of land management practices allowed by the ITP, and other relevant factors. The HCP must

not significantly (or "appreciably") impact any of the species' chances of recovery, as stated by the ESA. Additional mitigation measures must be provided to ensure that all land management practices potentially undertaken by Simpson will leave the covered species with a high probability of recovery.

Moreover, the HCP and DEIS need to identify species population levels and habitat conditions that would correspond to genuine recovery across the species' ranges, and provide concrete quantitative assessments of how the populations and habitat conditions stemming from the ITP and HCP will compare to these recovery standards.

Evaluations of the ITP and HCP's impacts on species' chances of recovery need to be based on more accurate baseline scenarios (i.e., "No Action" alternatives).

The legislative record for ESA s. 10(a) indicates that Congress intended for HCPs to *enhance* species' chances of survival. [HR Conference Report 835 (1982).] The HCP Handbook also cites this legislative intent and states that the Services should "encourage" landowners to provide a net benefit to species. [USFWS et al (1996), pp . 7-2 to 7-5 and 3-20.] The Department of Interior's testimony in response to the lawsuit against the "No Surprises" rule also recognizes that "[U]nder some circumstances, such as for 'severely depleted species and species for which the HCP covers all or a significant portion of the range' of a species,... measures to improve the species habitat may be required by the legislative history of [ESA] Section 10." [Federal Defendants' Combined Memorandum in Support of Cross-Motion For Summary Judgment and In Opposition to Plaintiffs' Motion for Summary Judgment, at 35 (D.D.C. Filed April 23, 1999), Spirit of the Sage Council et al v. Babbitt, No. 1:98CV1873 (EGS).]

Listed plants' chances of recovery must also be addressed and protected by ITPs and HCPs under ESA s. 7(a)(2). The Services may not approve an action which jeopardizes the survival or recovery of listed plants.

Additional Mitigation Standards

The Service's HCP Handbook states that if new habitat is being created as mitigation, then the habitat must be created through techniques that are proven and reliable or, if relatively new, then those techniques must be augmented by contingency measures and adaptive management. [USFWS et al (1996), p. 3-22.]

The Handbook also states that mitigation habitat should be close to the impact area, similar to the impacted habitat types, and support the same species. [USFWS et al (1996), p. 3-22.] The same mitigation methods should be used for the same species by different HCPs, unless there are "biological or other differences" which are "clearly explained." [USFWS et al (1996), p. 3-24.]

Mitigation and protection measures must be clearly defined for agencies to make decisions that hinge on such measures. Likewise, the mere promise of future actions is not sufficient to meet the ESA's protection standards. [See *LaFlamme v. FERC* (852 F.2d 389, 400 (9th Cir 1988), and *ONRC v. Daley* (1998 WL 296838) (D.Or 1998), as cited in Arum (1998), as well as *Sierra Club et al v. Bruce Babbitt et al*, Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

The Service's HCP Handbook states that mitigation habitat should be provided *prior* to the "take" of a species habitat. [USFWS et al (1996), p. 3-21.]

The HCP Handbook states that mitigation habitat should be permanently protected. [USFWS et al (1996), p. 3-22.]

ITPs/HCPs may not rely upon speculative sources of mitigation, such as promises of additional funds for habitat acquisition from unnamed sources. [*Sierra Club et al v. Bruce Babbitt et al*, Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

Providing funds for research is not sufficient as mitigation. [USFWS et al (1996), p. 3-23]

The HCP must also meet, with regard to each of the covered species, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999.]

"The operating conservation program will include those measurable actions that, when implemented, are anticipated to meet the biological objectives."

Adaptive Management and Regulatory Assurances

Landowner assurances should take the form of explicit, up-front agreements about the plan's biological goals, monitoring, adaptive management, and enforcement, and fair allocation of responsibility between the landowner and public for funding future plan changes. In other words, the plan should provide up-front clarity and assurances about the process that will be used to identify and make improvements to the plan -- instead of simply precluding meaningful plan improvements through "No Surprises" type assurances.

We cannot emphasize strongly enough that landowner assurances should *not* take the form of "No Surprises" type guarantees or other guarantees that largely preclude additional mitigation by setting extremely high burdens of proof for the Services, requiring additional mitigation to first occur on public lands, by requiring any additional mitigation to be fully subsidized by the public, and/or requiring any additional mitigation to be voluntary. "No Surprises" supposedly encourages landowners to proactively conserve species which are not listed as threatened or endangered by indemnifying the landowners from providing addition mitigation should the species be listed at a later date. However, the up-front analyses, protections, and mitigation measures for unlisted species are rarely sufficient, as evidenced

by virtually all existing forest HCPs in the region. Even in cases where the up-front provisions are more adequate, changes and additions to these measures may well become necessary over time, including as a result of changes in the landowners' management practices.

While many of the following standards will be relevant regardless of the type of regulatory assurances provided to Simpson, adherence to each of the following standards will be especially important if Simpson is provided with "No Surprises" type assurances, as envisioned by the draft HCP and IA.

Unlisted Species Must Be Addressed As if They Are Listed

In order for the Services to provide regulatory assurances with regard to the unlisted covered species, Simpson's HCP must address each species as if it were already listed.

The final "No Surprises" rule, the legislative history for ESA s. 10(a), and the Services' HCP Handbook all state that any unlisted species covered in an HCP must be addressed as if it were listed. Congress stated that "the Committee intends that... In the event that an *unlisted species* addressed in the approved conservation plan is subsequently listed ... no further mitigation requirements should be imposed *if the conservation plan addressed the conservation of the species and its habitat as if the species were listed* pursuant to the Act." [Conf. Report at 30 and 50 FR 39681-39691, Sept. 30. 1985. (emphasis added).] The "No Surprises" rule states that *"adequately covered means... with respect to unlisted species, that a proposed conservation plan has satisfied the permit issuance criteria under section 10(a)(2)(B) of the ESA that would otherwise apply if the unlisted species covered by the plan were actually listed."* [Federal Register, 63;35, February 23, 1998. (emphasis added).] The HCP Handbook also states that, in order to "adequately cover" an unlisted species, HCPs must satisfy the ESA s. 10(a)(2)(B) HCP issuance criteria for those species, as if the species had been listed. [USFWS et al (1996), pp. 3-30, 4-1.]

The draft "No Surprises" rule also stated that unlisted species need to be addressed by removing threats to their survival and recovery, such that the species would not need to be listed if the measures were undertaken across their range.

Adaptive Management Measures Must Be Provided for Any Data Gaps, to Respond to Changing Conditions, Etc.

The Department of Interior's testimony in response to the lawsuit against the "No Surprises" rule states, in effect, that large scale HCPs must have extensive, meaningful adaptive management provisions to be lawful. "The Services recognize that HCP permits often must be structured in such a way as to allow for the adaptation and refinement of mitigation measures over time as new scientific information becomes available.... Rather, the purpose of the No Surprises rule is to force the negotiating parties to clearly define up front a mutually-agreed upon framework for such adaptive management, if necessary due to scientific

uncertainty, and to establish a division of later responsibilities in the event of highly unlikely unforeseen events.... In the event there are significant gaps in the biological data underlying a particular HCP, those gaps should be addressed through the inclusion of adaptive management provisions." [Federal Defendants' Combined Memorandum in Support of Cross-Motion For Summary Judgment and In Opposition to Plaintiffs' Motion for Summary Judgment, at 2 (D.D.C. Filed April 23, 1999), Spirit of the Sage Council et al v. Babbitt, No. 1:98CV1873 (EGS).] The HCP Handbook also states that if information on unlisted species' conservation needs is lacking, then the landowner should either: i) use adaptive management to incorporate new information as it becomes available, ii) conduct additional research on the species' needs, or iii) agree to reduced "No Surprises" guarantees for those species. [USFWS, et al (1996), p. 3-30.]

As recognized by the Services' HCP Handbook, adaptive management is especially important for species whose conservation needs are not yet well known, as is usually the case with unlisted species. [USFWS et al (1994) and USFWS et al (1996).]

The HCP Handbook states that contingency measures should exist when landowners create/restore habitat as mitigation, in case the new habitat isn't viable. [USFWS et al (1996), p. 3-22]

ESA s. 10(a)(2)(B) also requires HCPs to include assurances the plans will be implemented, continue to minimize and mitigate the impacts of take, and continue to avoid jeopardizing the species' chances of survival and recovery. ESA s. 10(a)(2)(A)(iv) also requires the Services to require other measures as necessary to ensure the plan's success.

The HCP Handbook states that "thresholds" (i.e., triggers) for adaptive management review should be linked to key elements of the HCP and its monitoring protocol. Further, the thresholds must be based on measurable criteria. [USFWS et al. (1996). p. 3-25.]

The HCP must also meet, with regard to each of the covered species, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999.]

"...an adaptive management strategy is essential for permits that cover species that have significant biological data or information gaps that incur a significant risk to that species at the time the permit is issued."

"Possible significant data gaps that could lead to the development of an adaptive management strategy include, but are not limited to, significant biological uncertainty about specific information about the ecology of the species or its habitat (e.g., food preferences, relative importance of predators, territory size), habitat or species management techniques, or the degree of potential effects of the activity on the species covered in the incidental take permit."

"...there may be some circumstances with such a high degree of uncertainty that a species should not receive coverage in an incidental take permit at all until additional research is conducted." The HCP and DEIS must gauge the level of uncertainty that exists with regard to each of the covered species.

"A practical adaptive management strategy within the operating conservation program of a long-term incidental take permit will include milestones that are reviewed at scheduled intervals during the lifetime of the incidental take permit and permitted action."

"For an adaptive management strategy to be effective, it must be integrated into a monitoring program that is designed to ensure proper data collection and analysis that can guide appropriate adjustments in the operating conservation program."

Simpson is Responsible for Providing Additional Mitigation Measures Which May be Needed to Fully Protect and Recover Each of the Covered Species

In drafting ESA s. 10, Congress explicitly recognized that "...circumstances and information may change over time, and that the original plan might need to be revised. To address this situation, the Committee expects that any plan approved for a long-term permit will contain a procedure by which the parties will deal with unforeseen circumstances...." [Conf Rept at 30 and 50 FR 39681-39691, Sept. 30, 1985.] The Federal Register notice for the final "No Surprises" Rule states that "...many changes in circumstances during the course of an HCP can reasonably be anticipated and planned for in the conservation plan (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events), and the plans should describe the modifications in the project or activity that will be implemented if these circumstances arise...." [Federal Register, 63;35, February 23, 1998.] The final rule itself then states that "changed circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events)." [Federal Register, 63;35, February 23, 1998.] Likewise, the HCP Handbook states that "unforeseen circumstances" *don't* include changed conditions that could reasonably be anticipated by the landowner or the Services, including the listing of new species or modifications in the landowner's activities. [USFWS et al (1996), p. 3-28] Under the final "No Surprises" rule, landowners are responsible for providing improved and/or additional mitigation measures needed in response to "changed circumstances," *provided the mitigation measures are identified in the HCP.*

"Changing circumstances" which should be identified in the HCP include stand replacing fires, floods, and landslides, as well as the listing of additional species as Threatened or Endangered under the ESA. Other significant and reasonably foreseeable "changing circumstances," include changes in Simpson's land management practices; declines in the condition of the covered species due to inadequate conservation measures in the HCP; designation of critical habitat for the covered species; development of recovery plans and

recovery plan provisions for the covered species; and increased susceptibility of the forest to invasive exotic pests, pathogens, and plant and animal species due to the landowner's forest management practices. Possible management changes include use of shorter timber rotations, increased use of clearcutting and other even aged silviculture, use of "whole tree" and biomass harvesting, use of different tree species, use of genetically modified trees, increased use of fertilizers, herbicides, and other chemicals, and other types of intensified forest management.

Other foreseeable changing circumstances include the effects of human-induced climate change, which is likely to cause ecological gradients, vegetation zones, and species' habitat needs to shift significantly. This situation is similar to wildfires -- while we cannot predict exactly when and where wildfires will strike, we do know they are likely, and HCPs should account for their effects during planning, impact assessment, mitigation design, and adaptive management.

In addition to identifying these and other changing circumstances, the HCP must identify the specific adaptive management and additional mitigation measures that will be adopted to ensure the HCP's continued performance.

Several existing HCPs begin to demonstrate the practicability of adaptive management arrangements in which the landowner retains responsibility for providing addition mitigation as needed. The Washington DNR HCP's adaptive management plan identifies several potential management changes that the DNR will undertake should they become necessary, even if they involve additional costs to the DNR. These potential changes include providing buffers for intermittent streams, increasing spotted owl protections, and reducing sedimentation from roads. Plum Creek's existing HCP for the I-90 Corridor area in Washington also requires Plum Creek to modify and improve its forest management to meet target outcomes for northern spotted owl. Likewise, the company agreed to provide additional mitigation over time if required by watershed analysis and water quality monitoring.

Plum Creek's existing HCP also stated that the listing of new species as threatened or endangered shall not be considered "unforeseen" circumstances. Likewise, under this existing HCP, changes in Plum Creek's operational or management prescriptions resulting from the watershed analyses and aquatic monitoring components of the HCP's adaptive management provisions will not be considered "unforeseen" or "extraordinary" circumstances, and Plum Creek will provide additional or enhanced stream buffers or other protection measures if required by these analyses.

ESA s. 10 only allows for "take" permits (ITPs) to be issued for listed species. *Unlisted* species should *not* be included in the ITP or an HCP's Implementation Agreement (IA). The ESA's basic structure and precedents set by previous HCPs require the Services to re-examine the HCP in light of the ESA's HCP standards and issuance criteria with regard to newly listed species when deciding whether to add those species to an ITP. The ESA states

that "take" permits may be issued for species *listed* pursuant to the Act. In other words, unlisted species should *not* be expressly included in the ITP. Nor should species be automatically added to ITPs.

The question of whether or not unlisted species are adequately addressed by an HCP must be re-examined at the time those species are listed. The IA should expressly require the Services to re-examine, after a previously unlisted species is listed and if Simpson requests that the species be added to the ITP, whether the HCP still adequately addresses the species' conservation and mitigation needs under the ESA and its rules. This approach has been used in other existing HCPs and is quite reasonable. See Plum Creek's existing HCP for the I-90 corridor area in the central Washington Cascades, for example.

Similarly, the Services should not presume that the ESA s. 7 biological opinions drafted in conjunction with the HCP's initial approval will still be valid many years into the future when conditions have changed enough to warrant listing new species as Threatened or Endangered. Reinitiation of consultation is likely to be required when new species are listed. This should be recognized in the IA.

The HCP must also meet, with regard to each of the covered species, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999.]

"When an HCP, permit, and IA incorporate an adaptive management strategy, it should clearly state the agreed upon and warranted range of possible operating conservation program adjustments due to significant new information, risk, or uncertainty."

Monitoring Standards for the HCP

Monitoring provisions are mandatory for all HCPs. ESA s.10(a)(2)(B) states that the terms and conditions necessary to assure the plan will be implemented include reporting requirements. Reporting cannot occur without monitoring. Monitoring is also required under the Service's regulations at 50 CFR 17.22(b)(1)(iii)(B) and 50 CFR 222(b)(5)(iii). According to the HCP Handbook, all HCPs must monitor their impacts over time. [USFWS *et al* (1996), pp. 1-7 & 3-10]

The HCP Handbook states that an HCP's monitoring provisions should be as specific as possible and be commensurate with the project's scope and the severity of its effects. [USFWS et al (1996), p. 3-26] The Handbook also states that monitoring must be sufficient to detect trends in species' populations. [USFWS et al. (1996), p. 3-27.]

The HCP Handbook states that monitoring protocol must specify the frequency, timing, and duration of data collection; must specify how the data will be analyzed; and must specify who will do the analysis. [USFWS et al (1996), p. 3-27.]

The USFWS regulations state that by being granted an ITP, the landowner has agreed to grant access to Service staff to property, records, and other areas. [50 CFR 13.21(e)(2) and 13.47.]

The HCP must also meet, with regard to each of the covered species, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999]

"The biological outcome of the operating conservation program for the covered species is the best measure of success of an HCP."

"Monitoring is a mandatory element of all HCPs."

"The Services and the applicant must ensure that the monitoring program provides information to: (1) evaluate compliance; (2) determine if biological goals and objectives are being met; and (3) provide feedback to an adaptive management strategy, if used."

"...the scope of the monitoring measures should be commensurate with the scope and duration of the operating conservation program and project impacts."

"The following components are essential...: (1) the implementation and effectiveness of the HCP terms and conditions...; (2) the level of incidental take of the covered species; (3) the biological conditions resulting from the operating conservation program...; and (4) any informational needs of an adaptive management strategy, if utilized."

"The monitoring program will be based on sound science and standard survey or other monitoring protocols previously established...."

"The monitoring program should also clearly designate who is responsible for the various aspects of monitoring."

"Compliance is necessary... Therefore, the Services verify adherence to the terms and conditions of the incidental take permit, HCP, IA, and any other related agreements...."

"...it is important for the Services to make field visits to verify whether the report data are correct and the HCP is being implemented as negotiated."

"For large-scale and/or regional HCPs, oversight committees, made up of representatives from significantly affected entities (e.g., State Fish and Wildlife agencies), are often used to ensure proper and periodic review of the monitoring program...." At 431,000 acres and 50 years in duration, Simpson's proposed HCP would clearly be "large scale."

"Oversight committees should periodically evaluate the permittee's compliance with the HCP, its incidental take permit, and IA, and the success of the operating conservation program in reaching its identified biological goals and objectives. Such committees usually include species experts and representatives of the permittee, the Service, and other affected agencies and entities."

"Oversight committees should meet at least annually and review implementation of the monitoring program and filing of reports as defined in the HCP, permit, and/or IA."

"The Services should strive to collect information that will help detect cumulative trends in covered species populations or changes in the quality and/or quantity of the habitat...."

"Effects and effectiveness monitoring will generally include, but are not limited to, the following: 1. Periodic accounting of authorized incidental take; 2. Surveys to determine species status, appropriately measured for the particular operating conservation program (e.g., presence, density, or reproductive rates); 3. Assessments of habitat condition; 4. Progress reports on fulfillment of the operating conservation program (e.g., habitat acres acquired and/or restored); and 5. Evaluations of the operating conservation program and its progress toward its intended biological goals."

"The following represents the minimum information frequently needed in a monitoring program and its reports: 1. Objectives for the monitoring program; 2. Effects on the covered species and/or habitat; 3. Location of sampling sites; 4. Methods for data collection and variables measured; 5. Frequency, timing, and duration of sampling for the variables; 6. Description of the data analysis and who conducted the analyses; and 7. Evaluation of progress toward achieving measurable biological goals and objectives and other terms and conditions as required by the incidental take permit and/or IA."

Enforcement and Long-Term Implementation of the HCP

ESA ss. 10(a)(2)(A)(iv) and 10(a)(2)(B) state that the Services shall require "...other measures...necessary or appropriate for purposes of the plan" and "...other assurances...that the plan will be implemented." The HCP Handbook's template implementation agreement (IA) also states that the purpose of an IA is to ensure that each item of the HCP is implemented. [USFWS et al (1996), Appendix 4, pp. 3 & 6]

Further, the HCP Handbook also states that enforceable mitigation should be included in HCPs. [USFWS et al (1996), p. 1-16]

The HCP and ITP must be accompanied by a legally sufficient Implementation Agreement (IA).

Simpson must be required to restore damaged habitats, for example, if the company exceeds the allowable level of "take," fails to comply with the HCP's conservation measures, or

otherwise violates the HCP and IA. Simpson should not be indemnified from liability for monetary damages or restorative actions, for failure to implement the HCP's conservation measures and mitigate impacts to the covered species.

The IA must clearly maintain citizens' right to sue for enforcement of the ESA's protection measures for listed species. These measures should be understood to include the HCP's conservation measures, which are being substituted for the ESA's normal protection measures. It is well known that citizen suits have been essential to securing implementation of various aspects of the ESA. The San Bruno plan, the model for the ESA section 10 ITP/HCP process, maintained citizens' enforcement rights.

The Services' HCP Handbook's template IA also states that the purpose of an IA includes providing rights to remedies and relief. The Handbook's template IA includes some limited provisions for injunctive and temporary relief. [USFWS et al (1996), Appendix 4, pp. 3 & 6.] Such provisions are not without precedent. The IA for the Regli Estate HCP grants the Services the right to require restoration of any habitat values that are impacted in violation of the HCP. The Services may also seek damages for some types of violations.

The USFWS' new permit rules state that "a permittee... remains responsible for any outstanding minimization and mitigation measures required under the terms of the permit for take that occurs prior to surrender of the permit and such... even after surrendering the permit...." [50 CFR 17.22(b)(7) and 50 CFR 17.32, as established by June 17, 1999 Federal Register, 64;116.]

The HCP Handbook states that large scale HCPs may also need perpetual funding to cover long term monitoring and mitigation. [USFWS et al (1996), p. 3-24.]

The Service's Handbook states that the landowner should provide up-front legal or financial assurances, such as a letter of credit, if mitigation measures will be implemented after "take" occurs. [USFWS et al (1996), p. 3-22.]

The HCP Handbook anticipates that conservation easements can be used to ensure the HCP "runs with the land." [USFWS et al (1996), p. 6-30]

The USFWS' new permit revocation rule states, in effect, that an ITP will be revoked if the permit would "appreciably reduce the likelihood of the survival and recovery of the species in the wild." [50 CFR 17.22(b)(8) and 50 CFR 17.32, as established by June 17, 1999 Federal Register, 64;116, referring to ESA s. 10(a)(2)(B)(iv).]

ESA s. 10(a)(2)(C) states that the Services "...shall revoke a permit...if [they] find that the permute is not complying with the terms and conditions of the permit."

Duration of the ITP

The HCP must also meet, with regard to each of the covered species, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999.]

"...when determining incidental take permit duration... factors include duration of the applicant's proposed activities and the expected positive and negative effects on covered species... including the extent to which the operating conservation program will increase the survivability of the listed species and/or enhance its habitat."

"...the Services will also consider the extent of scientific and commercial data underlying the proposed operating conservation program for the HCP, the length of time necessary to implement and achieve the benefits of the operating conservation program, and the extent to which the program incorporates adaptive management strategies."

The Landowner's Eligibility for an ITP

ESA ITPs are premised upon the idea that the "take" of species and their habitats will be "incidental to otherwise lawful activities." [See ESA Ss. 10(a)(1)(B) and 10(a)(2)(B)(i) and USFWS et al (1996), p. 1-5.] Thus an ITP/HCP should not be granted for any forest management operation or other land use activity that violates federal, state, or local laws. The Services must assess Simpson's compliance with these requirements.

Furthermore, as per 50 CFR 13.21(b) and (c), 50 CFR 220.21(b), and USFWS et al (1996), p. 7-1, the Services must determine whether Simpson has:

i) been assessed a civil penalty or convicted of any criminal provision of any statute or regulation relating to the activity for which the permit application is filed, if this penalty or conviction evidences a "lack of responsibility;"

ii) failed to disclose material information or made false statements of material fact in connection with the permit application;

iii) failed to demonstrate a valid justification for the permit and a "showing of responsibility;"

iv) violated the Migratory Bird Act, the Lacey Act, or the Bald & Golden Eagle Protection Act; or

v) failed to submit valid, accurate, and timely reports required by their permit.

If the answer to any of these questions is "yes," then the landowner is not eligible to receive or keep a permit under the ESA, Migratory Bird Act, or Bald & Golden Eagle Protection Act.

Impact Minimization and Mitigation Measures for Salmon and Other Aquatic and Riparian Species

The HCP and DEIS must document whether the HCP's aquatic and riparian conservation measures will fully offset all impacts to the covered aquatic and riparian species, and whether these measures will produce habitat conditions which correspond to the survival and recovery of the covered species. The DEIS and HCP must identify the extent to which "take" of the various covered species will occur. The HCP and DEIS must address water flows and timing, and how they are affected by upslope forest management practices, temperature, the role of invertebrates as food sources and water quality indicators, and the impact of chemical applications, including around upslope intermittent streams. Wetlands, seeps, and springs must be addressed.

The HCP's riparian protection measures must, at a minimum, match the compromise standards recommended by NMFS for protecting salmonids in the "westside" forests of the West Coast states. These compromise standards include the NMFS proposal for "short term" HCPs in California (see NMFS (1999)). (See Table 1 below.)

Table 1. Summary of Compromise Aquatic Protection Standards for "Westside" West Coast Forests

NMFS "Short Term HCP" (NMFS (1999))	*Perennial Fish Bearing Streams:* 180 ft. buffer w/ no logging. No chemical applications. Additional buffer on steep slopes. *Perennial NonFish:* Same as perennial fish bearing. *Intermittent Streams:* 30 ft. buffer w/ no logging. Additional buffer to 100 ft. w/ significant retention during logging.
Pacific Lumber HCP	*Perennial Fish Bearing Streams:* 100 ft. buffer w/ no logging. Additional buffer to 170 ft. w/ significant retention during logging. *Perennial NonFish:* 30 ft. buffer w/ no logging. Additional buffer to 130 ft. w/ significant retention during logging. Additional buffer to 170 ft. w/ equipment exclusion. *Intermittent Streams:* 30 ft. buffer w/ no logging. Some exceptions. Additional buffer to 50 to 100 ft. w/ equipment exclusion.

Notes: For comparison purposes only. Does not include all aspects of the different standards.

A more credible HCP would employ standards considered to provide reasonable assurances of recovery. These include the standards employed by the Northwest Forest Plan for federal forests in the range of the Northern spotted owl, the standards proposed by Pollock et al (1998), and the "take" avoidance standards identified in the Draft Environmental Impact Statement (DEIS) for the Pacific Lumber Headwaters HCP (USFWS et al (1998)). (See Table 2 below.) It should also be noted that even the Northwest Forest Plan was only considered to have roughly an 80% probability of providing well distributed populations of salmonids across the federal lands in question. (USDA FS et al (1993))

USDA FS et al (1993), Huntington (1998), Pollock et al (1998), and the Draft EIS for the Pacific Lumber Headwaters HCP (USFWS et al (1998)) all indicate that buffer widths approaching two site potential trees are necessary to *begin* providing microclimate effects

Table 2. Summary of Aquatic Protection Standards that Provide a High Probability of Salmonid Recovery in Forested "Westside" West Coast Watersheds

NW Forest Plan	*Perennial Fish Bearing Streams:* 300 ft. buffer w/ no logging. *Perennial NonFish:* 150 ft. buffer w/ no logging. *Intermittent Streams:* 170 ft. buffer w/ no logging.
Pollock et al (1998)	*Perennial Fish Bearing Streams:* 250 ft. buffer w/ no logging. Some exceptions. *Perennial NonFish:* 250 ft. buffer w/ no logging. Some exceptions. *Intermittent Streams:* 105 to 250 ft. buffer w/ no logging. Some exceptions.
NMFS "No Take" (USFWS et al (1998))	*Perennial Fish Bearing Streams:* 340 ft. buffer w/ no logging. *Perennial NonFish:* 170 ft. buffer w/ no logging. *Intermittent Streams:* 100 ft. buffer w/ no logging.

Notes: For comparison purposes only. Does not include all aspects of the different standards

and habitat for riparian species. Amphibians and reptiles comprise a large portion of the ecosystem in all water systems and are an integral part of the food web. Adverse effects to amphibian and reptilian populations can lead to adverse impacts on aquatic species such as salmon and trout. Changes in microclimate conditions can alter the ecosystem of the riparian environment for amphibians, reptiles, and other plant and animal species. Buffer widths that allow increased direct and indirect solar radiation into the riparian zone will increase air temperature and decrease relative humidity in that area. If these measurements move beyond the tolerance levels of terrestrial riparian flora and fauna, these species may perish or be forced to find other suitable habitat to complete their life cycle. Rudolph et al (1990), for example, reported amphibian and reptile populations were significantly lower in aquatic habitats with narrow buffer widths (i.e., those less than 98 ft.) than those with wider buffer strips due to greater shading (i.e., less solar radiation and lower air temperatures) and open understory vegetation.

Intermittent streams normally provide important nutrients and food sources for fish and aquatic systems. Conversely, when impacted by logging and roading, these streams can significantly affect stream temperatures, sedimentation, hydrology, and other conditions downstream. The importance of intermittent, upslope streams to downstream fish habitat conditions is noted in USFWS (1999), NMFS (1998), and Reid et al (1999), for example, as well as in NMFS' critical habitat notices for Oregon Coast coho and Upper Columbia steelhead. Streamside trees and other vegetation are needed throughout all stream reaches to prevent erosion and wasting, and large woody debris is needed to help trap sediment, prevent scouring, and maintain other functions.

The HCP also needs to include adequate measures for seeps, springs, and other non-stream riparian areas. At a minimum, they should meet the standards recommended by NMFS (1998). More credible standards would include those employed by the Northwest Forest Plan and even the Pacific Lumber HCP. USDA FS et al (1993) and USDA FS et al (1994) recommend no-harvest buffers of 1 to 2 site potential trees (i.e., roughly 170 ft. to 340 ft.) around different types of non-stream riparian areas.

Inadequate measures on smaller streams, intermittent streams, seeps, and springs will lead to adverse impacts on the amphibian populations that are crucial to this habitat. The resulting lack of forest cover means that evapotranspiration rates are likely to increase with increasing air temperature and may contribute to a lowering of the groundwater table and soil moisture content. This may prematurely dry up intermittent streams, depriving flora and fauna of an important water source during the dry season. Intermittent streams also provide important primary habitat for a number of amphibians and other species, including species that do not tend to utilize larger streams as frequently. [American Lands (1998), Benda et al (1998), and USFWS (1998).] Equally important, roading, logging, and other operations within and adjacent to intermittent streams is likely to lead to significant amounts of erosion and sediment loading in downstream channels, including areas needed for salmon spawning and other functions.

USFWS (1998) also found that the aquatic conservation strategy proposed in NMFS (1998) is necessary, and indeed in some respects insufficient, for the conservation of riparian associated amphibians.

As recommended by Olson in Benda et al (1998), the HCP also needs to provide long term refugia (or "anchor" habitats) which contain the specific habitat elements needed by different riparian and aquatic habitat associated amphibians. Sites used by the different species need to be inventoried and protected.

The HCP must also protect and restore habitats on non-fish-bearing streams which historically supported salmonids and other aquatic and riparian species, or which are otherwise needed for the species' recovery. There is evidence that fish can utilize relatively steep stream reaches when large woody debris provides pools and "stair step" stream structure. [See Trotter (1995) and Montgomery (in preparation).]

The HCP and DEIS must mitigate for road densities and resulting impacts. Road densities are also a good indicator of likely impacts to salmonids and other aquatic species as well. Along with clearcutting, high road densities have been documented to result in substantial increases in peak stream flows, including, but not only, during rain on snow events. Peak flow increases of 20% to 50% have been reported in large watersheds as a result of road densities as low as 10% of the watershed area. [Grant (1994) and Grant et al (1996).]

The HCP should focus on road obliteration (i.e., restoration of approximate original contour) rather than mere road abandonment. Abandonment may not be sufficient to avoid significant risk of triggering large and cumulative small landslides.

The HCP must remediate existing stream crossings which are impassable to fish and/or which are likely to blow out under storm conditions, and protection measures needed for seeps and springs.

The HCP must address temperature and other water quality standards, including by identifying quantified objectives, monitoring indicators, and adaptive management provisions.

The HCP must address logging, chemical applications, intensive broadcast burning, and other activities permitted by the ITP across upslope areas, i.e., the majority of the land area in the HCP's covered watersheds. The HCP must provide retention requirements for understory vegetation, green trees, snags, and large woody debris.

The HCP and DEIS must include mitigation measures for the hydrological impacts of Simpson's proposed and potential silvicultural practices, as they may be allowed by the ITP. Along with high road densities, frequent, widespread clearcutting has been documented to result in substantial increases in peak stream flows, including, but not only, during rain on snow events. [Grant (1994) and Grant et al (1996).] Recent materials from the US EPA also confirm the importance of addressing "...hydrological maturity/successional issues ...(vegetation patterns/composition/structure) with respect to both peak flows and base flows" for the conservation of native fish, salmonids, amphibians, and other riparian habitat associates. [Moore (1998)]

The HCP must include measures to protect groundwater flows from roading and logging operations. Logging can affect groundwater flows by changing water retention timing and rates. Roading can affect groundwater flows by altering geology and soil hydrology.

The HCP and DEIS must address the extent and intensity of erosion and sedimentation likely to result from Simpson's upslope logging practices and other sources of soil disturbance across the plan area.

The HCP also fails to consistently and thoroughly require reductions in logging, roading, and other impacts on unstable slopes, including slopes at high risk of failure. Substantial amounts of logging are allowed in many slide prone areas. This will often be exactly the opposite of what is needed: retention of the larger trees, to maintain site stability, and to ensure that when failures do occur, large woody debris is delivered to stream channels.

The HCP must monitor aquatic invertebrates. The importance and utility of using invertebrates and other biological indicators during water quality assessments and monitoring is discussed in Karr et al (1999), Karr (1998), and Karr (1991). The Oregon plan for conserving coastal coho salmon also establishes basic protocol for using macro-invertebrates as water quality indicators.

It should not be assumed that existing watershed analysis processes are sufficient, including where they are being utilized as part of the existing regulatory framework that is incorporated as part of the HCP's mitigation measures.

The Washington watershed analysis process, which is often upheld as a model, nevertheless suffers from significant gaps and problems. Gaps and problems related to salmonids and bull trout include: 1) lack of assessment of the biotic integrity of waterbodies (e.g., macroinvertebrates); 2) limitation of riparian assessment to shade and large woody debris recruitment from stands adjacent to fish-bearing streams, ignoring other riparian functions such as microclimate, and food chain support and wood recruitment to non-fish channel segments for water quality (i.e. sediment routing) and as source for downstream stream reaches; 3) lack of an antidegradation policy and use-based water quality criteria (i.e., temperature standards) during water quality assessment; 4) during hydrology assessments, lack of consideration of surface/groundwater interactions, groundwater system recharge/discharge areas, subsurface flow and thermal regimes, and hydrologic functions of forest canopy in rain dominated landscapes (i.e. the process assumes the most significant effects of timber harvest on hydrologic processes is through the influence on snow accumulation and melt during rain-on-snow events); and 5) during temperature assessment, inadequate consideration of heat transfer from air to surface water, from soil to shallow groundwater, and from shallow groundwater to streams (i.e. ground/surface water interactions can result in adverse change to surface water temperature, causing potential loss of reach-scale thermal refugia and degrading summer rearing habitat for aquatic biota).

Impact Minimization and Mitigation Measures for Species Dependent on Old Growth and Older Forest Habitats:

Salmonids and other fish associated with forested watersheds co-evolved with habitat conditions and ecosystem processes that reflected the presence of old growth forests and other mature forest stands across substantial portions of the landscape. The relationship between salmon and forests appears to be truly symbiotic. In addition to being themselves dependent on habitat and watershed conditions associated with older forests, spawning salmonids and their predators and decomposers contributed heavily to the maintenance of soil nutrients and flaura and fauna in riparian zones, which in turn supported future salmon populations. [Lichatowich (1999)]

Restoring mature forest conditions across significant portions of forested watersheds is an essential component of protecting and recovering imperiled salmonids and other native fish species. A combination of forest protection, restoration, and improved management approaches can be used to meet this goal. The adoption of longer timber rotations is an economically-beneficial and "practicable" measure which can be used to supplement other protection and restoration measures by reducing cumulative watershed impacts, helping restore relatively mature forest conditions, and maintaining and even increasing landowners' timber production and revenues.

Failure to protect and restore older forest habitats is likely to impact the survival and recovery of a host of listed and unlisted species, including those not currently found in the plan area, but which will need viable habitats in the area for their recovery. It cannot be assumed that federal lands provide a sufficient basis for species' recovery. Most of the

habitat for most threatened and endangered species is found on non-federal lands. [GAO (1994)] Moreover, the Northwest Forest Plan for federal forestlands within the range of the Northern spotted owl was only expected to provide an 50% chance of supporting 41% of late successional forest species. (See Table 4 below.)

The Northwest Forest Plan also suffers from implementation problems and an inherent insufficiency for lower elevation forests and many late successional species. Well over half of the amphibian, bird, and mammal species associated with old growth forests in the Pacific Northwest have over half of their habitat on non-federal lands. Specifically, 67% of selected amphibians, 77% of selected birds, and 73% of selected mammals associated with old growth forests have 50% or more of their range on non-federal lands. (See Table 3 below.)

Table 3. Selected Late Successional Forest Species Within the Range of the Northern Spotted Owl That Depend Significantly (>25%) on Non-Federal Forests

Amphibians	Birds	Mammals
>25% Non-Federal Lands:	***>25% Non-Federal Lands:***	***>25% Non-Federal Lands:***
tailed frog	northern goshawk	American marten
Oregon slender salamander	Barrow's goldeneye (smr hab)	Fisher
Shasta salamander	Hammond's flycatcher	Forest deer mouse
Del Norte salamander	flammulated owl	Pacific shrew
Larch Mountain salamander	white headed woodpecker	***>50% Non-Federal Lands:***
>50% Non-Federal Lands:	black backed woodpecker	elk
northwestern salamander	Williamson's sapsucker	western red-backed vole
clouded salamander	***>50% Non-Federal Lands:***	southern red-backed vole
black salamander	wood duck	Townsend's chipmunk
Cope's giant salamander	bufflehead	northern flying squirrel
Pacific giant salamander	hermit thrush	dusky-footed woodrat
Dunn's salamander	brown creeper	shrew-mole
Van Dyke's salamander	Vaux's swift	deer mouse
Cascade torrent salamander	northern flicker	red tree vole
Olympic torrent salamander	hermit warbler	fog shrew
southern torrent salamander	pileated woodpecker	***>75% Non-Federal Lands:***
rough skinned newt	western flycatcher	red tree vole (California)
>75% Non-Federal Lands:	northern pygmy owl	
Columbia torrent salamander	bald eagle	
	varied thrush	
	hooded merganser	
	red crossbill	
	common merganser	
	chestnut backed chickadee	
	hairy woodpecker	
	golden crowned kinglet	
	red breasted nuthatch	
	white breasted nuthatch	
	pygmy nuthatch	
	red breasted sapsucker	
	barred owl	
	winter wren	
	warbling vireo	
	Wilson's warbler	
	>75% Non-Federal Lands:	
	Barrow's goldeneye (wtr hab)	

Source: WAFC (1997d) and USDA FS et al (1993). Notes: The FEMAT Report was developed primarily for management decisions on Federal lands and does not provide thorough analyses for non-Federal lands.

Table 4. Likelihood of Late Successional Forest Species Being Well-Distributed Across Federal Lands Under Option 9 of the Northwest Forest Plan

Species Group	# Species w/ 80% Chance or Less	# Species w/ 50% Chance or Less	# Species w/ 25% Chance or Less	Total # Species Studied
Fungi	519	182	99	527
Lichens	145	110	84	157
Bryophytes	1 group	0	0	13 groups
Vascular plants	40	19	12	131
Mollusks	102	99	14	102
Arthropods	10 groups	1 group	0	15 groups
Amphibians	13	5	3	19
Birds	2	0	0	37
Bats	7	2	0	11
Other mammals	4	0	0	12
Fish	6 groups	0	0	7 groups

Source: USDA FS et al (1993) and WAFC (d).

Additional Goals and Standards For Forest HCPs

The preceding goals and standards are based in part on those identified in Aengst *et al* (1998), Bean et al (1991), Bean (1998), Benda *et al* (1998), Cheever *et al* (1998), Hood *et al* (1998), Kareiva *et al* (1999), Murphy *et al* (1996), and Noss *et al* (1997). Additional goals and standards are provided in these sources. Key goals and standards identified by Kareiva et al (1999) include the following points:

Explicit scientific standards need to be developed for HCPs, particularly for larger ones.

Independent (and presumably, academic) scientific peer review panels should be consulted during HCP development, particularly for more significant plans.

Information on listed species, as well as monitoring data from HCPs should be made accessible in a centralized location, to facilitate better planning and plan evaluation.

When basic data on species, their conservation needs, resulting levels and impacts of "take," and other considerations are unavailable, data gaps should be filled *prior* to developing HCPs. Ideally, "take" permits should not be given to landowners when significant information needed to develop scientifically credible HCPs is lacking. Fewer data gaps should be allowed with plans covering larger areas, longer time frames, irreversible impacts, or multiple species.

If HCPs proceed in the absence of needed data, then approaches which provide greater levels of certainty for the species should be used.

If proposed mitigation measures cannot initially be demonstrated to be effective, then mitigation, monitoring, and evaluation should occur *prior* to "take."

Plans must be flexible, to allow for timely improvements based on monitoring results. If monitoring is used to help correct for data gaps, then mitigation measures must be adjusted as needed over time.

HCPs -- particularly those covering large areas or large amounts of a species' range -- should inventory, summarize, and document available data on each species and their distribution, abundance, population trends, ecological requirements, life history, and causes of endangerment.

Quantitative estimates of the impacts of "take" on species' viability should be provided, especially for larger or more significant plans. At a minimum, best and worst-case scenarios should be identified.

Impacts of "take" should also be evaluated, particularly for larger or more significant plans, including by determining whether the habitats being "taken" correspond to population "sources" or "sinks," whether genetically unique subpopulations are being "taken," and whether unique habitat/species combinations are being impacted.

The details of HCP mitigation measures must be explicitly described and accompanied by data on their effectiveness. The likely success of each measure must be evaluated, as must the overall effectiveness of mitigation measures at minimizing and offsetting "take."

Monitoring provisions should be used to evaluate mitigation measures' performance over time, and to assess impacts to species. Monitoring must be designed to facilitate timely improvements to mitigation measures.

HCPs need to quantify the plans' biological goals.

HCPs should evaluate the cumulative impacts of multiple plans and their interactions.

An HCP's adequacy is questionable if the plan fails to adequately address one or more of the following: species' status reviews, analyzing the proposed "take," assessing the impacts of "take," planning and assessing mitigation measures, and planning and assessing monitoring provisions.

HCPs should provide mitigation measures in a timely fashion, preferably before species are affected by "take."

HCPs should include contingency measures (i.e., adaptive management supported by monitoring) to address potential failures with mitigation measures.

The percentage of local *and* global populations that will be "taken" should be assessed.

Managers should adopt risk-averse strategies in the face of uncertainty.

Where possible, assertions made in HCPs should be supported by quantitative information.

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